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Abstract : Afterbody nozzle flow simulation studies were carried out with the three nozzles corresponding to reheat, dry and intermediate operating conditions for the LCA-GTX35VS configuration. Experiments were carried out in the free stream Mach number range of 0.6 to 1.6 and jet pressure ratio of 1 to 8. The jet at the nozzle exit was sonic throughout these experiments. Detailed pressure measurements were carried out on an axisymmetric version of the LCA afterbody with the above three nozzle configurations in the 0.3m trisonic wind tunnel. Afterbody pressure drag was obtained from the numerical integration of the afterbody static pressures.

Test results show that jet-free stream interactions during reheat nozzle operation provided a favourable effect on the LCA afterbody flow causing in general a decrease in afterbody pressure drag with the increase in nozzle jet pressure ratio. Dry nozzle operation had an adverse effect on the afterbody flow causing in general an increase in afterbody pressure drag with the increase in jet pressure ratio.

Comparison of the present test results with the available data shows that the pressure drag level of the LCA afterbody-nozzle configuration is higher because of its lower fineness ratio ($L/d_m \simeq 1$). Afterbody pressure drag level of the LCA-GTX35VS configuration can be significantly reduced by increasing its fineness ratio to about 1.5 - 1.8.

This report gives the details of pressure drag characteristics of the LCA afterbody configuration with three nozzle operating conditions.